WHAT IS CLAIMED IS:

1. A fiber optic amplifier system, comprising:

a crystal fiber doped with material which will lase;

a source of signals at the lasing frequency of said material which will lase;

a source of light for pumping said material which will lase;

an optical fiber coupled to said crystal fiber; and

means for coupling both said signals and said light for pumping onto said optical fiber.

2. A fiber optic amplifier system, as defined in Claim 1, in which said means for coupling comprises an optical coupler.

3. A fiber optic amplifier system, as defined in Claim 2, wherein said optical coupler comprises a single mode optical coupler.

4. A fiber optic amplifier system, as defined in Claim 2, in which said optical coupler utilizes evanescent field coupling.

5. A fiber optic amplifier system, as defined in Claim 2, in which said optical coupler provides different coupling coefficients for said signals and said light for pumping.

6. A fiber optic amplifier system, as defined in Claim 5, in which said optical coupler has a coupling efficiency which is wavelength dependent and in which signals and said light for pumping are at different wavelengths, yielding different coupling efficiencies for said signals and said light for pumping.

7. A fiber optic amplifier, comprising:

a fiber optic coupler including a pair of optical fibers juxtaposed to provide partial coupling of light between said fibers;

a source of pumping illumination coupled to a first end of one of said pair of fibers;

a source of signals to be amplified coupled to a first end of the other of said pair of fibers; and

a crystal formed of material which will possess a laser transition at the frequency of said signals to be amplified if said material is pumped with said pumping illumination, said crystal coupled to a second end of one of said pair of fibers.

8. A fiber optic amplifier, as defined in Claim 7, in which said fiber optic coupler has an effective interaction length at the juxtaposition of said optical fibers which is an even multiple of the coupling length of said fibers at said juxtaposition at the wavelength of one of said signals to be amplified and said pumping illumination and an odd multiple of the coupling length of said fibers at said juxtaposition at the wavelength of the other of said pumping illumination and said signals to be amplified.

9. A fiber optic amplifier, as defined in Claim 8, wherein said pair of optical fibers are laterally offset from one another to tune said coupler to the wavelength of said signals to be amplified and said pumping illumination.

10. A fiber optic amplifier, as defined in Claim 9, wherein said pair of optical fibers are arcuate and wherein the radius of said arcuate optical fibers is selected in accordance with the wavelength difference between said pumping illumination and said signals to be amplified.

11. A fiber optic amplifier, comprising:

an optical fiber formed of crystal material doped with material which will possess a laser transition at said signal wavelength when said material is pumped with illumination; and

means for superimposing pumping illumination and a signal to be amplified, and for coupling the resulting superimposed signal on one end of said optical fiber.

12. A fiber optic amplifier, as defined in Claim 11, wherein said superimposing means comprises an optical coupler having a different coupling efficiency for said signal to be amplified than for said pumping illumination.

13. A fiber optic amplifier, as defined in Claim 12, wherein said optical coupler provides said different coupling efficiency in accordance with the difference in wavelength of said pumping illumination and said signal to be amplified.

14. A fiber optic amplifier, as defined in Claim 11, wherein said optical fiber has a diameter which is less than the absorption length of said crystal material at the wavelength of said pumping illumination.

15. A method of amplifying a light signal carried by an optical fiber, comprising:

combining said light signal and pumping illumination on a single optical fiber; and

coupling said single optical fiber to a crystal fiber doped with material which will emit stimulated radiation at the frequency of said light signal if pumped with said pumping illumination.

16. A method of amplifying a light signal, as defined in Claim 15, wherein said combining step comprises multiplexing of said light signal and said pumping illumination in an optical coupler which has a coupling efficiency which is wavelength dependent.

17. A method of amplifying a light signal, as defined in Claim 16, wherein said multiplexing step comprises:

juxtaposing a pair of optical fibers to provide an interaction length; and

applying said light signal to one of said fibers